

prices¹⁸¹ by filling open asks on the marketplace; at the time, these open asks were higher than the initial sale price, and about 2.8 times the price of their physical counterparts.¹⁸²

79. StockX released the eighth Vault NFT linked to a Nike model, the Air Jordan 1 Retro High OG Patent Bred, on January 26, 2022, 8 days later, for \$300, slightly above the price of the physical shoes at the time.¹⁸³ First-day peer-to-peer prices averaged \$756, 2.6 times the level of the average physical shoes traded on that day on StockX.¹⁸⁴ Additional statistics on the released Vault NFTs associated with Nike sneakers, including the prices on the first day of release, are shown in Exhibit D1.

3. *February to May 2022: The rapid convergence to the physical price*

80. The initial price spike that followed the introduction of the Vault NFTs gave way to a drop in both transactions and prices within a matter of weeks, when prices stabilized and converged to a level close to the price of physical shoes. For example, looking at two of StockX’s most traded Vault NFTs associated with Nike sneakers, the Nike Blazer Low sacai KAWS Neptune Blue and the Air Jordan 1 Retro High OG Patent Bred, Exhibits 4 and 5 show the average weekly price of the Vault NFT and of the physical shoes traded on StockX in 2022. The average weekly price dynamics of additional Vault NFTs linked to two other Nike sneaker models are presented in Appendix D. The charts differentiate the prices achieved through peer-to-peer trades of the Vault NFT, StockX’s initial release price of the Vault NFT, and the average

¹⁸¹ StockX, “Email From Shervin Moghaddam to Scott Cutler and Yasir Malik,” January 20, 2022, STX0039795-801 at 795 (“No problem. Execute against the market...we are not here to preserve the price. Execute in 25 unit increments each half hour and be done in three hours.”).

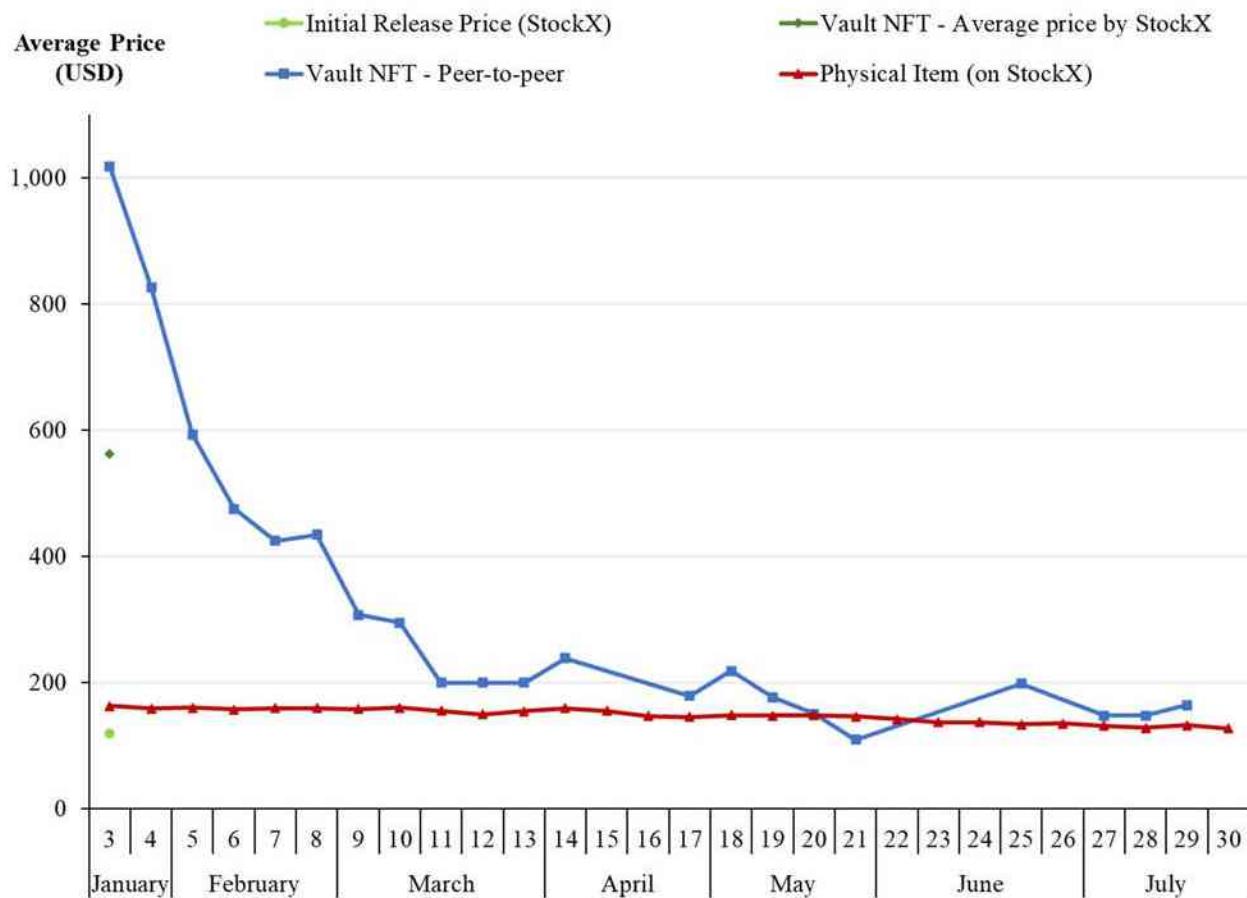
¹⁸² To obtain this number, I compute the ratio of the average price for Vault NFTs sold by StockX at market prices over the average physical price in January 2022 for each model. I then take the average of these ratios across models, weighted by the count of Vault NFTs sold by StockX at market prices. I exclude the price of Air Jordan 1 sneakers from this average because they were released separately. See StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026.

¹⁸³ The initial release price for Vault NFTs is inferred based on their uniform price of \$300 sold by StockX on the first day of release. The average price of physical Air Jordan 1 sneakers sold on the StockX website on January 26, 2022 is \$295. See StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026.

¹⁸⁴ \$756 is the average peer-to-peer price on January 26, 2022, the day that Air Jordan 1 Vault NFTs were first released. $2.6 = \$756 / \295 , with \$295 corresponding to the average physical price on that day. See StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026.

price that the Vault NFT was sold for by StockX. These latter prices differ for the Nike Blazer Low sacai KAWS Neptune Blue due to the initial bug that increased scarcity.

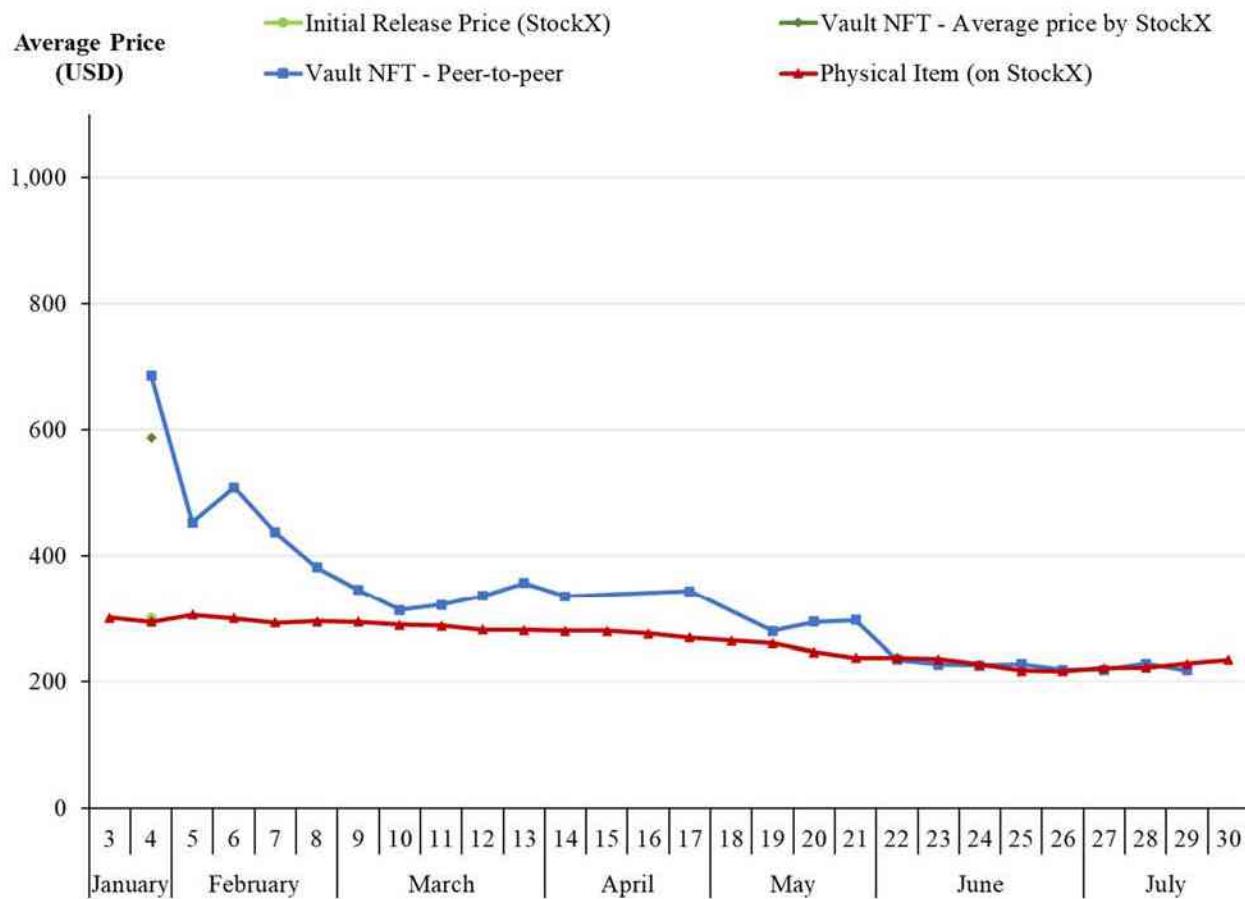
Exhibit 4: Weekly Average Prices of Nike Blazer Low sacai KAWS Neptune Blue Sneakers¹⁸⁵



Notes:

[1] All Vault NFTs for this model were released by StockX on January 18, 2022.
 [2] This chart shows the weekly average price of physical sneaker and Vault NFT transactions, using the variable for Gross Monetary Value. “Vault NFT – Average price by StockX” reflects the average release price of the Vault NFTs that were not sold at the initial release price. “Physical Item (on StockX)” refers to the average price of the associated physical sneaker on StockX. StockX’s initial release price and the average release price differ, [REDACTED]

¹⁸⁵ StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026. See also StockX, “Vault Drop 1 Pricing,” January 11, 2022, STX0121216 (providing release prices).

Exhibit 5: Weekly Average Prices of Air Jordan 1 Retro High OG Patent Bred Sneakers¹⁸⁶**Notes:**

[1] All Vault NFTs for this model were released by StockX on January 26, 2022.

[2] This chart shows the weekly average price of physical sneaker and Vault NFT transactions, using the variable for Gross Monetary Value. The initial release price for Vault NFTs is inferred based on their uniform price of \$300 sold by StockX on the first day of release. “Physical Item (on StockX)” refers to the average price of the associated physical sneaker on StockX. “Vault NFT – Average price by StockX” reflects the average release price of the few Vault NFTs that were not sold at the initial release price on the first day of release.

81. In May 2022, at the time of Nike’s first amended complaint, the price of the few Vault NFTs traded on a peer-to-peer basis was, on average, 7% higher than the physical shoes

¹⁸⁶ StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026. See also StockX, “Vault Drop 1 Pricing,” January 11, 2022, STX0121216 (providing release prices).

traded on StockX,¹⁸⁷ and 14% higher when looking at April and May together.¹⁸⁸ Further, looking at transactions of Vault NFTs associated with Nike shoes between April 1 and May 25, 2022,¹⁸⁹ prices ranged between \$143 and \$479, for an average close to \$300.¹⁹⁰ Contrary to the description in the First Amended Complaint, at this time, there were no “Nike-branded Vault NFTs [] still selling for thousands of dollars above the price of the physical shoe.”¹⁹¹

B. The evolution of Vault NFT prices is similar to that of many other novel asset classes subject to irrational exuberance among users

82. High initial prices followed by a price decline for traded assets—otherwise known as bubbles—are not unusual in contexts where traders are uncertain about the true value of the underlying technology. The price dynamics observed for StockX’s Vault NFTs are therefore not unlike the ones seen for a range of assets linked to other new technologies since the nineteenth century. The causes for these bubbles have been studied extensively by economists in the past decades. In the case of Vault NFTs, the uncertainty regarding the valuation of the new asset, the underlying technology, and the expected adoption rate of the new vault service may have caused high initial demand followed by a rapid correction, possibly once uncertainty and initial over-excitement faded.

83. Plentiful economic research has studied the dynamics of irrational over-investments motivated by “fads and fashions, overconfidence and related psychological biases that might lead to momentum trading, trend chasing, and the like.”¹⁹² This phenomenon has been

¹⁸⁷ This percentage corresponds to the ratio of the average peer-to-peer price over the average physical price in May 2022. These ratios are calculated individually for each model, and then weighted by the count of peer-to-peer Vault NFTs sold in May. See StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026.

¹⁸⁸ This percentage corresponds to the ratio of the average peer-to-peer price over the average physical price in April and May 2022. These ratios are calculated individually for each model, and then weighted by the count of peer-to-peer Vault NFTs sold in April and May. See StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026.

¹⁸⁹ The First Amended Complaint was filed on May 25, 2022.

¹⁹⁰ \$299.5 is the average of each Vault NFT’s average peer-to-peer price, weighted by the number of Vault NFT transactions of each model between April 1 and May 25, 2022. See StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026.

¹⁹¹ First Amended Complaint, ¶ 65.

¹⁹² Dilip Abreu and Markus Brunnermeier, “Bubbles and Crashes,” *Econometrica*, Vol. 71, No. 1, 2003, pp. 173-204.

called irrational exuberance—a term coined by then-Federal Reserve Board chairman Alan Greenspan when talking about the dot-com bubble in the 1990s—and memorialized by Nobel-prize economist Robert Shiller in his seminal book *Irrational Exuberance*.¹⁹³ Shiller describes the Dutch tulip mania in the 1630s as the first speculative bubble of importance driven by irrational exuberance, and he has more recently described Bitcoin as a financial bubble driven by irrational exuberance.¹⁹⁴ Further, numerous studies have shown that bubbles consistently form in laboratory experiments, and are driven by investor behavior, including by irrationality exhibited by investors at the beginning of experiments.¹⁹⁵ These asset price bubbles form in laboratory experiments even when investors have common knowledge of the fundamental value of the asset.¹⁹⁶

84. Uncertainty is a common cause of initial overinvestment in assets and, therefore, inflated prices.¹⁹⁷ This is particularly the case for assets linked to new technologies, “when

¹⁹³ Robert Shiller, *Irrational Exuberance* 3rd Ed., Princeton, NJ, Princeton University Press, 2016.

¹⁹⁴ Cointelegraph, “Nobel Prize Winner Uses Bitcoin as Example of Irrational Exuberance,” September 5, 2017, <https://cointelegraph.com/news/nobel-prize-winner-uses-bitcoin-as-example-of-irrational-exuberance> (When asked about a current example of irrational exuberance or a speculative bubble, Shiller claims “The best example right now [of irrational exuberance] is Bitcoin.”).

¹⁹⁵ Gunduz Caginalp, David Porter, and Vernon Smith, “Overreaction, Momentum, Liquidity, and Price Bubbles in Laboratory and Field Asset Markets,” *Journal of Psychology and Financial Markets*, Vol. 1, 2000, pp. 24-48, p. 24 (“What drives stock prices? Certainly earnings—or more generally, fundamental value—play a role. Investor behavior, however, is increasingly considered as another important factor.”). See also Vivian Lei, Charles Noussair, and Charles Plott, “Nonspeculative Bubbles in Experimental Asset Markets: Lack of Common Knowledge of Rationality vs. Actual Irrationality,” *Econometrica*, Vol. 69, No. 4, 2001, pp. 831-859, p. 858 (“A full investigation of the reasons behind the bubble phenomenon is far beyond the scope of a single set of experiments or a single paper. However, a brief description of what we think we have seen in our experiment might be useful. The behavior exhibited by the asset markets over time appears to have stages not unlike the stages that have been postulated for other experiments (Plot (1996)). The beginning involves some confusion and irrationality.”), p. 831 (“A bubble is operationally defined as ‘trade in high volumes at prices that are considerably at variance from intrinsic values.’ The result has been replicated and shown to be robust to several changes in the experimental design (see, for example, King et al. (1993), Fisher and Kelly (2000), Porter and Smith (1995), Van Boening, Williams, and LeMaster (1993).”).

¹⁹⁶ Vivian Lei, Charles Noussair, and Charles Plott, “Nonspeculative Bubbles in Experimental Asset Markets: Lack of Common Knowledge of Rationality vs. Actual Irrationality,” *Econometrica*, Vol. 69, No. 4, 2001, pp. 831-859, pp. 831-832 (“In all of these studies, markets are created for assets with a lifetime of a finite number of periods (typically 15 or 30 periods) ... The dividend paid is identical for each trader and the dividend process is common knowledge to all traders. Rather than tracking the fundamental value, the market price time series is usually characterized by a ‘boom’ phase, a period of time in which prices are higher than fundamental values, often followed by a ‘crash,’ a sudden rapid drop in price.”).

¹⁹⁷ Brent Goldfarb and David Kirsch, *Bubbles and Crashes: The Boom and Bust of Technological Innovation*, Stanford, CA, Stanford University Press, 2019, p. 22 (“The financial economics literature has suggested that bubbles are more likely to occur under greater uncertainty and that speculation will end as this uncertainty is resolved.”).

investors have trouble understanding how a technology will fit into [the] system, or alternatively, when it is surmised that a new technology might displace extensive portions of a value chain, then this will encourage investment.”¹⁹⁸ Economic research has found that many of the major technological innovations of the nineteenth and twentieth centuries, such as the steam engine train, the telegraph, the airplane, or the personal computer have been accompanied by bubbles in the stock price of parent firms.¹⁹⁹ For many new products however, initial uncertainty and price volatility tends to correct quickly once investors better understand the product and its value.²⁰⁰

85. More recently, analyses of trends in crypto asset markets have shown that cryptocurrencies and other decentralized finance innovations are prone to speculative bubbles, generally attributable to uncertainty in the future value of the assets, a lack of understanding of fundamentals, and irrational exuberance. For instance, a literature review of investor behavior in the cryptocurrency markets concluded, “the crypto market is dominated by irrational investors, who base their investment decisions on market sentiment,” and that “the uncertainty of fundamentals leads to investors’ dispersed beliefs, leading to high trading and speculative bubbles.”²⁰¹ Another paper, which studied the price patterns of 14 crypto assets—including two cryptocurrencies, nine DeFi tokens, and three tokenized NFTs tradeable on cryptocurrency exchanges—documented bubbles for the three types of assets.²⁰² Recent research on Initial Coin Offerings (ICOs), which are used to issue crypto tokens and have emerged as an alternative

¹⁹⁸ Brent Goldfarb and David Kirsch, *Bubbles and Crashes: The Boom and Bust of Technological Innovation*, Stanford, CA, Stanford University Press, 2019, p. 22.

¹⁹⁹ Alina Sorescu, Sorin M. Sorescu, Will J. Armstrong, and Bart Devoldere, “Two Centuries of Innovations and Stock Market Bubbles,” *Marketing Science*, Vol. 37, No. 4, 2018, pp. 507-529, p. 525 (“We examine 51 major innovations that were commercialized during the 19th and 20th centuries. In 37 of these 51 cases, we detect the presence of bubbles in the stock price of parent firms.”).

²⁰⁰ Brent Goldfarb and David Kirsch, *Bubbles and Crashes: The Boom and Bust of Technological Innovation*, Stanford, CA, Stanford University Press, 2019, p. 22 (“The financial economics literature has suggested that bubbles are more likely to occur under greater uncertainty and that speculation will end as this uncertainty is resolved.”).

²⁰¹ José Almeida and Tiago Cruz Gonçalves, “A Systematic Literature Review of Investor Behavior in the Cryptocurrency Markets,” *Journal of Behavioral and Experimental Finance*, Vol. 37, 2023, pp. 1-18, p. 14.

²⁰² Youcef Maouchi, Lanouar Charfeddine, and Ghassen El Montasser, “Understanding Digital Bubbles Amidst the COVID-19 Pandemic: Evidence from DeFi and NFTs,” *Finance Research Letters*, Vol. 47, 2022, pp. 1-8, p. 5 (“[W]e find that the average magnitude, measured as the price increase per bubble day, is much higher for DeFi and NFTs compared to pure cryptocurrencies … However, DeFi and NFTs experience less bubbles compared to pure cryptocurrencies.”).

channel for start-up financing, describes a “relatively new and complex” market,²⁰³ “a novel mechanism”²⁰⁴ with which investors have limited experience and that is surrounded by much uncertainty.²⁰⁵ A prominent form of ICOs is where issued digital tokens function as an exclusive medium of exchange on a new platform or represent access to a new product or service. Because these tokens are easily tradable, price volatility is high and based on the market’s perception of the underlying project.²⁰⁶ Uncertainty arises from the fact that, while such “tokens are worthless when the platform is small and processes a small number of transactions, these tokens appreciate in value as the platform scales, automatically rewarding early contributors for taking risk and supporting its development when its success was uncertain.”²⁰⁷

86. In the case of Vault NFTs, the uncertainty is compounded by the fact that Vault NFTs are what economists call a network technology. A network technology is characterized by the presence of network externalities linked to technology adoption: the value of the technology for a given user depends on the adoption rate of others. One example of such technology, which I

²⁰³ Sabrina Howell, Marina Niessner, and David Yermack, “Initial Coin Offerings: Financing Growth With Cryptocurrency Token Sales,” *NBER Working Paper 24774*, 2019, pp. 1-64, p. 1 (“Initial coin offerings (ICOs) are a new method of raising capital for early stage ventures, an alternative to more traditional sources of start-up funding such as venture capital (VC) and angel finance.”); Avtar Sehra, *Economics of Initial Coin Offerings*, August 2017, https://www.researchgate.net/publication/351626829_Economics_of_Initial_Coin_Offerings, p. 2 (“The market for Initial Coin Offerings (ICOs) is a relatively new and complex phenomenon, which consists of organisations issuing transferrable tokens to the general public.”).

²⁰⁴ Christian Catalini and Joshua Gans, “Initial Coin Offerings and Value of Crypto Tokens,” *Social Science Research Network*, 2019, pp. 1-37, p. 2 (“Initial coin offerings (ICOs) have emerged as a novel mechanism for financing entrepreneurial ventures. Through an ICO, a venture offers a stock of specialized crypto tokens for sale with the promise that those tokens will operate as the only medium of exchange when accessing the venture’s future products.”).

²⁰⁵ John Conley, “Blockchain and the Economics of Crypto-tokens and Initial Coin Offerings,” *Vanderbilt University Department of Economics Working Papers*, 2017, pp. 1-18, p. 12 (“Tokens are new thing. Investors don’t have much experience with them so they may not be very good at estimating their value. In addition, blockchain is a relatively new technology and there is a great deal of uncertainty [sic] over how much potential for profit there is and which sectors are the right ones to invest in.”).

²⁰⁶ Avtar Sehra, *Economics of Initial Coin Offerings*, August 2017, https://www.researchgate.net/publication/351626829_Economics_of_Initial_Coin_Offerings, p. 6 (“As discussed in the introduction, this is where the issued digital token represents access to some product or service that either already exists or will exist in the future. ... However, unlike normal licenses these issued tokens are easily transferable, either directly between users (over the counter) or through an established cryptocurrency exchange. This ease of transferability of the tokens on an exchange enables liquidity and thus drives price volatility based on the market’s perception of the issuing project.”).

²⁰⁷ Christian Catalini and Catherine Tucker, “Antitrust and Costless Verification: an Optimist and a Pessimistic View of the Implications of Blockchain Technology,” *Antitrust Law Journal*, Vol. 82, No. 3, 2019, pp. 861-872, pp. 866-867.

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have described in my research, is video-messaging.²⁰⁸ When Skype launched as one of the first video-messaging services, its value to one person depended on how many others had adopted the software and were available for calls. Similarly, the value of a Vault NFT for one person depends on how many others will adopt the technology. This idea can be illustrated by considering the potential for savings on shipping and authentication costs. Whether these savings will be realized depends on the likelihood that one Vault NFT owner interested in selling will be able to find a buyer interested in acquiring the digital asset. If no one wants to buy the Vault NFT, the owner will need to retrieve the shoes from the StockX Vault—paying a \$35 withdrawal fee, shipping fees, and sales taxes²⁰⁹ in the process—and list them on StockX or another platform, where they will again incur fees associated with verification and shipment of the shoes (see Exhibit 2). However, if the Vault NFT is an accepted technology, owners will be able to sell these assets without incurring those costs. Furthermore, the more times a Vault NFT is traded before the physical pair of shoes is redeemed, the greater the potential savings in shipping and authentication costs. Therefore, the expected benefits of the technology vary depending on future technology adoption. In the case of a network technology, the valuation of a product by early investors depends on those investors’ beliefs regarding technology adoption.

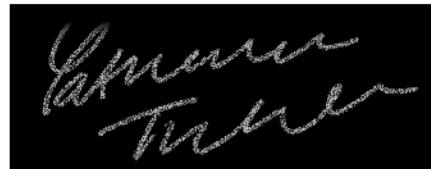
87. In addition, some investors may consciously invest in a new technology at elevated prices if they have the confidence that, even if the asset is overvalued, there is a sufficiently high chance that subsequent buyers will pay an even higher price for the asset. These types of investors, which have been called rational arbitrageurs in the literature, understand that the asset price will ultimately decline, but nevertheless choose to purchase it at an inflated price in an attempt to “ride the bubble.”²¹⁰ This type of behavior has been documented in cases

²⁰⁸ Catherine Tucker, “Identifying Formal and Informal Influence in Technology Adoption with Network Externalities,” *Management Science*, Vol. 54, No. 12, 2008, pp. 2024-2038.

²⁰⁹ StockX, “What fees are associated with Vault NFTs?,” April 14, 2022, <https://stockx.com/help/articles/What-fees-are-associated-with-Vault-NFTs> (“Vault NFTs have additional fees to withdraw your item. When withdrawing a Vault NFT, customers are subject to a \$35 withdrawal fee, shipping, and any applicable sales tax.”).

²¹⁰ Dilip Abreu and Markus Brunnermeier, “Bubbles and Crashes,” *Econometrica*, Vol. 71, No. 1, 2003, pp. 173-204, p. 174 (“We study the impact of rational arbitrage in this setting. We suppose that rational arbitrageurs understand that the market will eventually collapse but meanwhile would like to ride the bubble as it continues to grow and generate high returns. Ideally, they would like to exit the market just prior to the crash, to ‘beat the gun’ in Keynes’ colorful phrase.”).

including the South Sea Bubble or the Technology Bubble.²¹¹ The rational arbitrageurs’ willingness to pay is therefore rooted in their expectations about what other potential buyers will be willing to pay. To the extent that a new asset is seen by rational arbitrageurs as likely to achieve widespread adoption and likely to produce excitement and purchase interest, this perception can facilitate higher willingness to pay by the rational arbitrageurs. Similarly, it is possible that some early investors in Vault NFTs thought they were overvalued compared to the physical shoes but were expecting the demand to grow such that they could plan on reselling at an even higher price at a future date.



Catherine Tucker, Ph.D.

²¹¹ Peter Temin and Hans-Joachim Voth, “Riding the South Sea Bubble,” *American Economic Review*, Vol. 94, No. 5, 2004, pp. 1654-1668, p. 1654 (“This paper presents a case study of a well-informed investor in the South Sea bubble. We argue that Hoare’s Bank … knew that a bubble was in progress and nonetheless invested in the stock; it was profitable to ‘ride the bubble.’”); Markus Brunnermeier and Stefan Nagel, “Hedge Funds and the Technology Bubble,” *The Journal of Finance*, Vol. 59, No. 5, 2004, pp. 2013-2040, p. 2014 (“First, our analysis indicates that hedge funds were riding the technology bubble. Over our sample period 1998 to 2000, hedge fund portfolios were heavily tilted toward highly priced technology stocks. The proportion of their overall stock holdings devoted to this segment was higher than the corresponding weight of technology stocks in the market portfolio … Second, we find that that the hedge funds in our sample skillfully anticipated price peaks of individual technology stocks … As a result, hedge fund managers captured the upturn, but avoided much of the downturn.”).

APPENDIX A

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EDUCATION

Stanford University, Ph.D. in Economics (Advisor: Tim Bresnahan), 2005

Oxford University, BA in Politics, Philosophy and Economics, 1999

APPOINTMENTS

MIT Sloan, Faculty Chair EMBA Program, July 2022 –

MIT Sloan, Sloan Distinguished Professor of Management Science, September 2015 –

MIT Sloan, Chair MIT Sloan PhD Program, July 2015 -2022

MIT Sloan, Professor of Management Science, July 2015 –

MIT, Co-Founder of the MIT CryptoEconomics Lab, 2018 -

National Bureau of Economic Research (NBER), Research Associate, September 2012 –

MIT Sloan, Mark Hyman Jr. Career Development Professor (with tenure), July 2012 – September 2015

MIT Sloan, Associate Professor of Management Science, July 2011 – July 2015

National Bureau of Economic Research (NBER), Faculty Research Fellow, May 2011 – September 2012

MIT Sloan, Douglas Drane Career Development Chair in IT and Management, July 2006 –

MIT Sloan, Assistant Professor of Marketing, July 2005 – June 2011

HONORS AND AWARDS

2020	CITI Fellowship (Columbia University Institute of TeleInformation)
2020	O'Dell Award
2020	TechSIG-Lazaridis Prize for Best Paper in Innovation, Technology and Interactivity for 2019
2018	ISMS Long Term Impact Award
2018	O'Dell Award
2018	MSI Scholar
2017	Congressional Testimony on 'Algorithms: How Companies' Decisions About Data and Content Impact Consumers'
2017	Nominated for Teacher of the Year award (Also in 2012, 2010 and 2009)
2015	Erin Anderson Award
2014	Paul E. Green Award
2013	Teacher of the Year Award, MIT Sloan
2013	Jamieson Prize for Excellence in Teaching
2012	Garfield Economic Impact Award for Best Paper in Health Economics
2011	WHITE Award for best paper in the Economics of Healthcare IT
2011	Public Utility Research Prize for the best paper in regulatory economics
2011	NSF CAREER Award
2011	MSI Young Scholar
2010	Management Science Distinguished Service Award
2004	Koret Foundation Scholar, Stanford Institute for Economic Policy Research Fellowship
2004	Fourth Annual Claire and Ralph Landau Student Working Paper prize

PUBLISHED/ACCEPTED PAPERS

1. 'Identifying Formal and Informal Influence in Technology Adoption with Network Externalities', *Management Science*, Vol. 55 No. 12, December 2008, pp. 2024-2039
2. 'Privacy Protection and Technology Diffusion: The Case of Electronic Medical Records' with Amalia Miller, *Management Science (Lead Article)*, Vol. 55 No. 7, July 2009, pp.

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3. 'How Sales Taxes Affect Customer and Firm Behavior: The Role of Search on the Internet' with Eric Anderson, Nathan Fong and Duncan Simester, *Journal of Marketing Research*, Vol. 47 No. 2, April 2010, pp. 229-239
4. 'Growing Two-sided Networks by Advertising the User Base: A Field Experiment', with Juanjuan Zhang, *Marketing Science*, Vol. 29 No. 5, September-October 2010, pp. 805-814
5. 'Privacy Regulation and Online Advertising' with Avi Goldfarb, *Management Science*, Vol. 57 No. 1, January 2011, pp. 57-71
 - Nominated for Long Term Impact Award 2020
6. 'Search Engine Advertising: Channel Substitution when Pricing Ads to Context', with Avi Goldfarb, *Management Science*, Vol. 57 No 3, March 2011, pp. 458-470
7. 'Stuck in the Adoption Funnel: The Effect of Interruptions in the Adoption Process on Usage' with Anja Lambrecht and Katja Seim, *Marketing Science*, Vol. 30 No. 2, March-April 2011, pp. 355-36
8. 'Advertising Bans and the Substitutability of Online and Offline Advertising', with Avi Goldfarb, *Journal of Marketing Research (Lead Article)*, Vol. 48 No. 2, April 2011, pp. 207-227
9. 'Can Healthcare Information Technology Save Babies?' with Amalia Miller, *Journal of Political Economy*, Vol. 119 No. 2, April 2011, pp. 289-324
10. 'How Does Popularity Information Affect Choices? A Field Experiment' with Juanjuan Zhang, *Management Science*, Vol. 57 No. 5, May 2011, pp. 828-842
11. 'Online Display Advertising: Targeting and Obtrusiveness' with Avi Goldfarb, *Marketing Science (Lead Article and Discussion Paper)*, Vol. 30 No. 3, May-June 2011, pp. 389-404
 - 'Rejoinder - Implications of "Online Display Advertising: Targeting and Obtrusiveness' with Avi Goldfarb, *Marketing Science*, Vol. 30 No. 3, May-June 2011, pp. 413-415
 - Nominated for John D. C. Little Award
 - Nominated for Long Term Impact Award 2017

- Long Term Impact Award 2018

12. 'Encryption and Data Security' with Amalia Miller, *Journal of Policy Analysis and Management*, Vol. 30 No. 3, Summer 2011, pp. 534-556

13. 'Paying With Money or With Effort: Pricing When Customers Anticipate Hassle' with Anja Lambrecht, *Journal of Marketing Research*, Vol. 49 No. 1, February 2012, pp. 66-82.

14. 'Heterogeneity and the Dynamics of Technology Adoption' with Stephen Ryan, *Quantitative Marketing and Economics*, Vol 10 No. 1, March 2012, pp 63-109

15. 'Shifts in Privacy Concerns', *American Economic Review: Papers and Proceedings* with Avi Goldfarb, Vol. 102 No. 3, May 2012, pp. 349-53

16. 'How does the Use of Trademarks by Intermediaries Affect Online Search?' with Lesley Chiou. *Marketing Science*, Vol 31 No. 5, September 2012, pp 819-837

17. 'Active Social Media Management: The Case of Health Care' with Amalia Miller. *Information Systems Research*, Vol. 24 No. 1, March 2013, pp. 52-70

- Republished as part of Informs 'Healthcare in the Age of Analytics' series

18. 'Paywalls and the Demand for News' with Lesley Chiou. *Information Economics and Policy*, Vol. 25 No. 2, June 2013, pp. 61-69

19. 'Days on Market and Home Sales' with Juanjuan Zhang and Ting Zhu. *RAND Journal of Economics*, Vol. 44 No. 2, Summer 2013, pp. 337-360,

20. 'When Does Retargeting Work? Timing Information Specificity' with Anja Lambrecht. *Journal of Marketing Research (Lead Article)* Vol. 50 No. 5, October 2013, pp. 561-576

- Paul E. Green Award for the 'Best article in the Journal of Marketing Research that demonstrates the greatest potential to contribute significantly to the practice of marketing research.'
- William O'Dell Award. This award honors the JMR article published in 2013 that has made the most significant, long-term contribution to marketing theory, methodology, and/or practice

21. 'Health Information Exchange, System Size and Information Silos' with Amalia Miller. *Journal of Health Economics*, Vol. 33 No. 2, January 2014: pp. 28-42

22. 'Electronic Discovery and the Adoption of Information Technology' with Amalia Miller. *Journal of Law, Economics, & Organization (Lead Article)*, Vol. 30. No. 2, May 2014, pp. 217-243

23. 'Social Networks, Personalized Advertising, and Privacy Controls.', *Journal of Marketing Research*, Vol. 51 No. 5, October 2014, pp. 546-562.

- Citation of Excellence Award Emerald Publishing
- Nominated for William O'Dell Award (2019)

24. 'Trademarks, Triggers, and Online Search' with Stefan Bechtold. *Journal of Empirical Legal Studies*, Vol. 11 No. 4, December 2014

25. 'The Reach and Persuasiveness of Viral Video Ads' *Marketing Science*, Vol. 34 No. 2, 2015, pp. 281-296

26. 'Privacy Regulation and Market Structure' with James Campbell and Avi Goldfarb. *Journal of Economics & Management Strategy*, Vol 24, No. 1, Spring 2015, pp. 47-73

27. 'Standardization and the Effectiveness of Online Advertising' with Avi Goldfarb. *Management Science*, Vol. 61 No. 11, 2015, pp. 2707-2719

28. 'Harbingers of Failure' with Eric Anderson, Song Lin and Duncan Simester. *Journal of Marketing Research (Lead Article)*, Vol. 52 No. 5, Oct 2015, pp. 580-592

- William O'Dell Award. This award honors the JMR article published in 2015 that has made the most significant, long-term contribution to marketing theory, methodology, and/or practice

29. 'The Effect of Patent Litigation and Patent Assertion Entities on Entrepreneurial Activity' with Stephen Kiebzaka. and Greg Rafert. *Research Policy*, Vol. 45 No. 1, February 2016, pp. 218-231

30. 'When early adopters don't adopt' with Christian Catalini. *Science*, Vol. 357, Issue 6347, 2017 pp. 135-136

31. 'Network Stability, Network Externalities, and Technology Adoption' in *Advances in Strategic Management*, Vol. 37, 2017, pp.151 - 175

32. 'Digital Content Aggregation Platforms: The Case of the News Media.' with Lesley Chiou - *Journal of Economics & Management Strategy*, Vol. 26 No. 4, 2017, pp. 782-805

33. 'Should You Target Early Trend Propagators? Evidence from Twitter' with Anja Lambrecht and Caroline Wiertz (Lead Article). *Marketing Science*, Vol. 37 No. 2, 2018, pp. 177-199

34. 'Privacy Protection, Personalized Medicine and Genetic Testing' with Amalia Miller. *Management Science*, Vol. 64 No. 10, 2018, pp. 4648-4668.

35. 'Digital Economics' with Avi Goldfarb, *Journal of Economic Literature*, Vol. 57 No. 1, 2019, pp. 3-43

36. Collusion by Algorithm: Does Better Demand Prediction Facilitate Coordination Between Sellers? with Jeanine Miklós-Thal *Management Science*, Vol. 65 No. 4, 2019, pp. 1552-1561

37. 'Algorithmic Bias? An Empirical Study into Apparent Gender-Based Discrimination in the Display of STEM Career Ads ' with Anja Lambrecht. *Management Science* 2019, Vol 65, No 7, pp. 2966-2981

- TechSIG-Lazaridis Prize for Best Paper in Innovation, Technology and Interactivity for 2019

38. 'How Effective Is Black-Box Digital Consumer Profiling And Audience Delivery?: Evidence from Field Studies' with Nico Neumann and Tim Whitfield. *Marketing Science*, Dec, 2019, Vol 38, No 6, pp. 918-926 (Lead Article)

39. The Surprising Breadth of 'Harbingers of Failure' with Duncan Simester and Clair Yang. *Journal of Marketing Research* 2019, Vol 56, No. 6, pp 1034-1049

40. 'Consumer privacy and the future of data-based innovation and marketing.' with Alexander Bleier and Avi Goldfarb. *International Journal of Research in Marketing* Volume 37, Issue 3, September 2020, Pages 466-480

41. 'Informational Challenges in Omnichannel Marketing: Remedies and Future Research' with Tony Cui, Anindya Ghose, Hanna Halaburda, Raghuram Iyengar, Koen Powels, S. Siriam, and Sriraman Vankatarman. *Journal of Marketing* 2021, Vol. 85(1) 103-120

42. 'Product Quality and Performance in the Internet Age: Evidence from Creationist Friendly Curriculum' with Ananya Sen. *Journal of Marketing Research* 2022, Vol 59, No.1, pp :211-29

43. 'Conducting Research in Marketing with Quasi-Experiments' with Avi Goldfarb and Yanwen Wang, (Lead Article) *Journal of Marketing* 2022, Vol 86, No 3, pp 1-20.

44. 'How Do Restrictions on Advertising Affect Consumer Search?' with Lesley Chiou, *Management Science*, 2022, Vol. 68, No. 2, pp. 866-882.

45. 'Privacy Regulation and Barriers to Public Health' with Joe Buckman and Idris Adjerid. Forthcoming at *Management Science*, 2022

46. 'What Blockchain Can and Can't Do: Applications to Marketing and Privacy' with Alex Marthews. Forthcoming at *International Journal of Research in Marketing*

47. What Type of Digital Advertising is Most Effective for B2B Prospecting? The Case of IT Decision-Makers with Nico Neumann, Kumar Subramanyam and John Marshall Conditionally accepted at *Quantitative Marketing and Economics*

48. 'TV Advertising and Online Sales: The Role of Inter-Temporal Substitution' with Anja Lambrecht and Xu Zhang Conditionally accepted at *Journal of Marketing Research*

49. Data Deserts and Black Boxes: The Impact of Socio-Economic Status on Consumer Profiling with Nico Neumann, Levi Kaplan, Alan Mislove, and Piotr Sapie'zy'nski. Conditionally accepted *Management Science*

CHAPTERS IN EDITED VOLUMES AND SUMMARY PIECES

50. 'Modeling Social Interactions: Identification, Empirical Methods and Policy Implications' with Wes Hartmann, Puneet Manchanda, Harikesh Nair, Matt Bothner, Peter Dodds, David Godes and Karthik Hosanagar, *Marketing Letters*, Vol. 19 No. 3, December 2008, pp. 287-304

51. 'Search Engine Advertising - Examining a profitable side of the long tail of advertising that is not possible under the traditional broadcast advertising model' with Avi Goldfarb, *Communications of the ACM*, Vol. 51 No. 11, November 2008, pp. 22-24

52. 'Online Advertising', with Avi Goldfarb, *Advances in Computers*, Vol. 81, March 2011, Marvin Zelkowitz (Ed), Elsevier

53. 'Substitution between Online and Offline Advertising Markets', with Avi Goldfarb, *Journal of Competition Law and Economics*, Vol. 7 No. 1, March 2011, pp. 37-44

54. 'Online Advertising, Behavioral Targeting, and Privacy', with Avi Goldfarb, *Communications of the ACM*, Vol. 54 No. 5, May 2011, 25-27

55. 'Privacy and Innovation', *Innovation Policy and the Economy*, Vol. 11, 2012, Josh Lerner and Scott Stern (Eds), NBER

56. 'The Economics of Advertising and Privacy', *International Journal of Industrial Organization*, Vol. 30 No. 3, May 2012, pp. 326-329

57. 'Empirical Research on the Economic Effects of Privacy Regulation'. *Journal on Telecommunications and High Technology Law*, Vol. 10 No. 2, Summer 2012, pp. 265-272

58. 'Social Networks, Advertising and Antitrust', with Alex Marthews, *George Mason Law Review*, 2012, Vol 19 No 5., pp. 1211-1227.

59. 'Why Managing Customer Privacy Can Be an Opportunity' with Avi Goldfarb, *Spring 2013, Sloan Management Review*

60. 'The Implications of Improved Attribution and Measurability for Antitrust and Privacy in Online Advertising Markets', *George Mason Law Review*, Vol. 2 No. 2, pp. 1025-1054 (2013).

61. 'Patent Trolls and Technology Diffusion' Chapter in NBER book 'Standards, Patents and Innovations' (2014), Timothy Simcoe, Ajay K. Agrawal, and Stuart Graham

62. 'Privacy and the Internet' Chapter 11, *Handbook of Media Economics*, 2016, Edited by Simon Anderson and Joel Waldfogel

63. Frontiers of Health Policy: Digital Data and Personalized Medicine, *Innovation Policy and the Economy*, Vol. 15, 2016, Josh Lerner and Scott Stern (Eds), NBER

64. 'Impacts of Surveillance on Behavior' with Alex Marthews, in Gray, David C. and Henderson, Stephen (Editors), *The Cambridge Handbook of Surveillance Law* (2017).

65. 'On Storks and Babies: Correlation. Causality and Field Experiments, ' with Anja Lambrecht, *GfK Marketing Intelligence Review*, Vol 8. No 2. 2016

66. 'Field Experiments in Marketing,' with Anja Lambrecht, *Handbook of Marketing Analytics*, Edited by Natalie Mizik and Dominique Hanssens, Edward Elgar Publishing, (2018)

67. 'Can Big Data Protect a Firm from Competition?', *CPI Chronicle*, January, 2017 with Anja Lambrecht

68. Network Effects and Market Power: What Have We Learned in the Last Decade? *Antitrust* Vol. 32 No 2., Spring 2018

69. 'Inequality, Privacy and Digital Market Design', with Avi Goldfarb, Chapter in *Fair by Design* edited by Scott Kominers and Alex Teytelboym, 2017, Oxford University Press

70. 'Digital Data, Platforms and the Usual [Antitrust] Suspects: Network Effects, Switching Costs, Essential Facility' *Review of Industrial Organization* Volume 54, pp 683–694 (2019)
71. 'Antitrust and Costless Verification: An optimistic and a pessimistic view of the implications of blockchain technology' with Christian Catalini, *Antitrust Law Journal* - Volume 82 Issue 3, 2019
72. Online Advertising and Antitrust: Network Effects, Switching Costs and Data as an Essential Facility. April 2019, *'Competition Policy International'*
73. Blockchain and Identity Persistence, with Alex Marthews, Chapter in *Cryptoassets: Legal, Regulatory, and Monetary Perspective*, edited by Chris Brummer, Oxford University Press, 2019.
74. 'Digital Marketing,' with Avi Goldfarb, in the *Handbook of the Economics of Marketing*, Volume 1, edited by JP-Dube and Peter Rossi, pp. 259-290, Elsevier
75. 'Privacy Policy and Competition', with Alex Marthews. *Brookings Papers*
76. Digital Infrastructure: Does the 'Coring' of Digital Platforms make them part of Digital Infrastructure?." (2020) in 'Economic Analysis and Infrastructure Investment' edited by Edward L. Glaeser and James M. Poterba, University of Chicago Press
77. Competition in the Digital Advertising Market, The Global Antitrust Report on the Digital Economy (2021)
78. How Platforms Create Value Through Coring and Implications for Market Definition, *Competition Policy International* (2022)
79. Digital Disruption in Schooling and the Pandemic: Documenting the Digital Infrastructure Divide Among School Children with Ananya Sen, Societal Experts Action (2022) Network
80. Algorithmic Exclusion, *Brookings Paper*, (2022)

BOOKS EDITED

81. The Evolution of Antitrust in the Digital Era: Essays on Competition Policy, with David Evans and Alan Fels Ao. November 9, 2020

82. Blockchain: The Insights You Need from Harvard Business Review (HBR Insights Series), 2019
83. Economic Analysis of the Digital Economy, University of Chicago Press, 2015, with Avi Goldfarb and Shane Greenstein
84. The Economics of Digitization, Edward Elgar Publishing, 2013., with Avi Goldfarb and Shane Greenstein

POLICY WRITING

85. OECD Roundtable on Privacy, Report on the 'Economic Value of Online Information', December 2010
86. Written Congressional Testimony on 'Internet Privacy: The Impact and Burden of European Regulation,' U.S. House Energy and Commerce Committee, September 2011
87. Written Congressional Testimony on 'Algorithms: How Companies' Decisions About Data and Content Impact Consumers,' U.S. House Energy and Commerce Committee, November 2017

PAPERS UNDER REVIEW

88. 'Social Advertising: How Advertising that Explicitly Promotes Social Influence Can Backfire'. Revise and resubmit at *Management Science*
89. 'Patent Trolls and Technology Diffusion: The Case of Medical Imaging' Revise and resubmit at *RAND Journal of Economics*
90. 'Third-Party Certification: The Case of Medical Devices' with Cristina Nistor Revise and resubmit at *Management Science*
91. 'Tensile Promotions in Display Advertising' with Anja Lambrecht Revise and resubmit at *Quantitative Marketing and Economics*
92. 'Choosing to Discover the Unknown: The Effects of Choice on Users' Attention to Online Video Advertising" with Jack Jiang Zhenhui and Cheng Luo and Cheng Yi and Xiuping Li Revise and resubmit at *Management Science*

93. 'Guns, Privacy and Crime' with Alessandro Acquisti Revise and resubmit at *Information Systems Research*

94. 'Does IT Lead to More Equal or More Unequal Treatment? An Empirical Study of the Effect of Smartphone Use on Social Inequality in Employee-Customer interactions' with Shuyi Yu and Yifei Wang. Revise and Resubmit at *Information Systems Research*.

95. The Effect of Subsidizing Digital Educational Content: Evidence from a Field Experiment with Jingcun Cao and Yifei Wang. Revise and resubmit at *Management Science*

96. Algorithmic Influence: Empirical Evidence from Microlending with Jianfeng Guo, Xitong Li and Cathy Yang. Revise and Resubmit at *Information Systems Research*.

97. Scaling Smart Contracts via Layer-2 Technologies: Some Empirical Evidence. with Wiliam Cong, Xiang Hui, and Luofeng Zhou, Revise and Resubmit at *Management Science*.

98. 'Apparent Algorithmic Discrimination and Real-Time Algorithmic Learning with Anja Lambrecht

99. 'The Digital Privacy Paradox: Small Money, Small Costs, Small Talk' with Susan Athey and Christian Catalini, and Alex Moehring

100. 'Tradeoffs in Automated Political Advertising Regulation: Evidence from the COVID-19 Pandemic' with Grazia Cecere, Clara Jean, and Vincent Lefrere

101. 'Social Distancing, Internet Access and Inequality' with Leslie Chiou

102. 'The Shifters and Virality of Hate Speech Online' with Uttara Ananthakrishnan

103. Deplatforming and the Control of Misinformation: Evidence from Parler with Saharsh Agarwal and Uttara M Ananthakrishnan

104. The Role of Delayed Data in the COVID-19 Pandemic, with Yifei Wang

WORK IN PROGRESS

Data Analysis

105. 'Big Bad Data: The Case of For-Profit College Advertising' with Avinash Gannamaneni and Avi Goldfarb

106. 'Selection and Inequality in Big Data' with Amalia Miller
107. 'Spillovers from Product Failure' with Amalia Miller
108. 'Rules For a Nascent Domain: Technological Innovation and Regulatory Uncertainty' with Christian Catalini

Data Collection

109. 'Mergers and Big Data: Evidence from Healthcare' with Amalia Miller
110. 'Privacy Regulation and Education IT' with Amalia Miller and Avi Goldfarb
111. 'The Lack of Appeal of Cross-Partisan Appeals: Evidence from an Experiment on Facebook' with Christina KaChapelle
112. 'The Resilience of Franchise Business Models: Evidence from the Pandemic' with Avi Goldfarb and Verina Que

Manuscripts

113. 'Data Privacy and Children: An Empirical Study of Mobile Applications' with Grazia Cecere, Fabrice Le Guel, Vincent Lefrere, and Pai-Ling Yin
114. 'Government Surveillance and Internet Search Behavior' with Alex Marthews
115. 'A New Method of Measuring Online Media Advertising Effectiveness: Prospective Meta-Analysis in Marketing' with Gui Liberali, Glen L. Urban, Benedict G. Dellaert, Yakov C. Bart, and S. Stremersch.
116. **Empirically evaluating two-sided network effects: The case of electronic payments**
117. 'Personalizing mental fit for online shopping applications - How the success of recommendations depends on mental categorization and mental budgeting' with Oliver Emrich and Thomas Rudolph.

INVITED SEMINARS

Universities

1. May 2023, University of Washington
2. May 2023, TOM Group, HBS
3. April 2023, Tilburg University

4. April 2023, Yale University
5. March 2023, Emory University
6. March 2023, University of Zurich, Cryptoeconomics group
7. February 2023, CBER Forum
8. February 2023, University of Arizona
9. February 2023, Columbia University, Marketing Group
10. February 2023, New York University, IS Group
11. November 2022, LSE, Marketing Group
12. September 2022, Advertising Research Group Amazon
13. March 2022, Marketing Group, Rotman, University of Toronto
14. March 2022, IT Group, Krannert School, Purdue University
15. November 2021, Tufts University, Economics Department
16. October 2021, McGill University, Marketing Group
17. September 2021, Stockholm Business School
18. May 2021, Safegraph Seminar
19. item April 2021, Marketing Science Institute
20. April 2021, George Mason University, Law and Economics Seminar
21. March 2021, Marketing Group, University of Michigan
22. March 2021, BIDT, Bavarian Academy of Sciences and Humanities
23. February 2021, University of Virginia, Law and Economics Seminar
24. January 2021, Marketing Group, Carnegie Mellon University
25. December 2020, Boston University, Boston Digital Leadership Forum
26. December 2020, Toulouse University, France
27. November 2020, Luohan Academy, Platform Economy and Market Dynamics, Virtual Seminar
28. November 2020, John Hopkins University
29. October 2020, Wharton, Marketing Group
30. October 2020, ITAM, Mexico City
31. September 2020, Econ, Stats and ML Team, Etsy
32. June 2020, CMU Seminar
33. April 2020, Virtual Digital Economy Seminar
34. March 2020, IS group, University of Minnesota
35. February 2020, Georgia Institute of Technology, GA
36. December 2019, HBS Field Experiments Seminar, Cambridge, MA
37. November 2019, Bank of Canada, Ottawa
38. May 2019, Joint-Economics Seminar, Autonomous University of Barcelona) and the IAE (Institute for Economic Analysis)
39. March 2019, LMU Center for Advanced Management Studies in Munich
40. February 2019, Berlin Applied Micro Seminar
41. January 2019, Marketing Group, University of Bologna
42. January 2019, Marketing Group, University College, London
43. January 2019, Marketing Group, London Business School
44. November 2018, Marketing Group, HEC Paris, France
45. November 2018, Management Group, Cass Business School, City University of London, UK

46. November 2018, Marketing Group, SOAS University of London
47. November 2018, All Souls College, Oxford
48. November 2018, Economics Group, Paris Telecom
49. October 2018, Marketing Group, University of Amsterdam, Netherlands
50. October 2018, Marketing Group, King's Business School, King's College, London
51. September 2018, Marketing Group, University of Frankfurt, Germany
52. June 2018, Harbin Institute of Technology, China
53. February 2018, IS/OM Group, New York University, NY
54. November 2017, Marketing Group, Rochester University, NY
55. October 2017, Marketing Group, Maryland University, MD
56. May 2017, Marketing Group, Old Dominion University
57. April 2017, Marketing Group, University of Southern California
58. March 2017, Marketing Group, Arison School of Business, IDC, Israel
59. January 2017, Distinguished Speakers Series, McGill University, Canada
60. September 2016, Technology Group, Harvard Business School, MA
61. August 2016, Southern Jiatong University, Sichuan, China
62. May 2016, Chapman University, Marketing Group
63. April 2016, Carnegie Mellon University, Public Policy Group
64. April 2016, Harvard Business School, Entrepreneurial Management Group
65. March 2016, INSEAD, Marketing Group
66. March 2016, University of Paris-Sud, Privacy Research Group
67. March 2016, Vienna University of Economics and Business, Marketing Group
68. September 2015 University of Maryland, IS Group
69. June 2015, Marketing Group, University of Cambridge, UK
70. May 2015, Marketing Group, University of Texas at Dallas, TX
71. March 2015, Health Policy Group, Georgia State University, GA
72. March 2015, Marketing Group, University of Colorado, CO
73. February 2015, Strategy Group, University of North Carolina, NC
74. January 2015, Marketing Group, Emory University, GA
75. December 2014, OPIM, Wharton School of Management, PA
76. October 2014, Economics Department, Yale University, CT
77. September 2014, Marketing Group, Boston University, MA
78. March 2014, Technology Group, University of California at Berkeley, CA
79. January 2014, Marketing Department at Texas A&M
80. November 2013, Marketing Group, University of California at Berkeley, CA
81. October 2013, Marketing Group, Tulane University, LA
82. October 2013, Marketing Group, University of Houston, TX
83. May 2013, Tuck School of Management, Dartmouth University, NH
84. March 2013, Economics Department, University of Toulouse
85. March 2013, Marketing Group, Rotterdam University
86. March 2013, Economics Department, University of Zurich
87. March 2013, Marketing group, Georgia Tech
88. January 2013, Anderson School, UCLA
89. January 2013, Marketing Group, CMU
90. October 2012, Marketing Group, Stanford University

91. October 2012, Marketing Group, Columbia University
92. October 2012, Marketing Group, University of Texas at Austin
93. September 2012, Marketing Group, Harvard Business School
94. June 2012, Strategy Group, London Business School
95. March 2012, Marketing Group, Cornell
96. February 2012, IS Group, Indian School of Business
97. February 2012, Marketing Group, Wharton
98. January 2012, Marketing Group, UCLA
99. November 2011, Marketing Group, University of Rochester
100. October 2011, Marketing Group, University of Zurich
101. October 2011, Department of Law and Economics, Swiss Federal Institute of Technology, Zurich
102. May 2011, Marketing Group, National University of Singapore
103. May 2011, IS Group, National University of Singapore
104. May 2011, Strategy Group, LMU Munich
105. May 2011, Marketing Group, New York University
106. March 2011, Marketing Group, Florida University
107. February 2011, IS Group, New York University
108. November 2010, European School of Management and Technology
109. October 2010, Marketing Group, Yale University
110. October 2010, Networked Business Group, Harvard Business School
111. September 2010, TIES Group, MIT Sloan
112. July 2010, Department of Economics, University of Mannheim
113. March 2010, Marketing Group, Wharton School, University of Pennsylvania
114. January 2010, Marketing Group, University of Michigan
115. November 2009, Marketing Group, University of California at Berkeley
116. October 2009, Digital Business Seminar, MIT Sloan
117. December 2008, Marketing Group, MIT Sloan
118. November 2008, Marketing Group, Rady School of Business, UCSD
119. September 2008, Strategy Group, MIT Sloan
120. May 2008, Digital Strategy Group, Tuck School of Business, Dartmouth University
121. April 2008, Kellogg Management and Strategy Group, Northwestern University
122. March 2008, Marketing Group, Duke University
123. March 2008, Strategy Group, Chicago GSB
124. July 2007, Marketing Group, London Business School, London, UK
125. April 2007, Marketing Group, Chicago GSB
126. March 2007, Marketing Group, Rotman School, University of Toronto
127. November 2005, Economics Department, Harvard University
128. October 2004-February 2005 (Job Market): NYU Stern, University of Michigan, University of Arizona, University of British Columbia, Federal Reserve Board, Federal Reserve Bank of New York, Harvard Business School, Kellogg, MIT Sloan, Federal Reserve Bank of Chicago, Stanford Economics Department

Other

129. April 2021, American Enterprise Institute

130. June 2020, EE Times- Privacy and Security during Covid-19
131. May 2020, The Digital Economy & The Coronavirus, Bertelsmann Foundation Seminar
132. April 2020, Technology Policy Institute
133. October 2018, Digital Competition Expert Panel, HM Treasury, UK
134. October 2018, Competition and Markets Authority, UK
135. January 2018, IMF
136. December 2017, Technology Policy Institute
137. October 2016, Federal Communications Commission
138. April 2015, Federal Communications Commission
139. November 2014, Office of Research at the Consumer Financial Protection Bureau
140. April 2014, Big Data Working Group, The White House.
141. February 2014, Main Street Patent Coalition, Panel hosted at the Senate by Senator Orrin Hatch
142. July 2013, Federal Communications Commission
143. August 2012, DG Competition, European Commission, Brussels
144. August 2012, Technology Policy Institute Conference, Aspen
145. December 2011, Havas Digital, New York
146. June 2011, Eneca
147. September 2010, Federal Trade Commission
148. September 2010, Google European Public Policy Unit, Paris
149. July 2009, Information Technology and Innovation Foundation, Washington DC

PRESENTATIONS OF RESEARCH AT CONFERENCES

1. June 2023, Marketing Science, Miami, FL
2. June 2023, Doctoral Consortium, Miami, FL
3. April 2023, University College London, Competition Law and Policy in a Data-Driven Economy
4. December 2022, Keynote 'Conference on Artificial Intelligence, Machine Learning and Business Analytics, Harvard University
5. May 2022, Keynote 'AI and Analytics for Social Causes' conference, University of Maryland, College Park
6. December 2021, Keynote, 4th Research on Innovation, Science and Entrepreneurship Workshop, Max Planck Institute
7. November 2021, Keynote, Tokenomics, NYU
8. June 2021, Marketing Science
9. June 2021, OECD workshop on the Value of Data
10. June 2021, Chief Competition Economist ECN working group Annual Meeting
11. May 2021, International Finance Corporation, World Bank IFC Digital Jobs
12. May 2021, G20 Framework Working Group Seminar on Data Access and Availability
13. May 2021, Data and innovation: solutions and business models in the digital economy (Brazil)
14. March 2021, Digital Economics Seminar, Digital Tutorial

15. December 2020, Digital Economics Research Network Conference
16. December 2020, Conference on Artificial Intelligence, Machine Learning, and Business Analytics
17. December 2020, Health Systems Innovation Advisory Board Meeting
18. November 2020, 2nd Luohan Academy Frontier Dialogue - Platform Economy and Market Dynamics
19. October 2020, Policy Toolkit for a Better Europe, European Commission
20. September 2020, ICN Annual conference
21. June 2020, Marketing Science
22. June 2020, International Competition Network, 'Competition law enforcement at the intersection of Competition, Consumer Protection, and Privacy'
23. November 2019, ABA Fall Forum: The Tech Summit, Washington DC.
24. November 2019, Annual Challenges to Antitrust in a Changing Economy, Harvard Law School
25. October 2019, World Bank Platforms Summit, Washington DC.
26. September 2019, Economics of AI Doctoral Consortium, Toronto
27. July 2019, Quantitative Marketing and Structural Econometrics Workshop, Northwestern University
28. June 2019, Marketing Science, Rome
29. June 2019, Keynote Speaker, ZEW Conference on the Economics of Information and Communication Technologies, Mannheim
30. June 2019 Keynote Speaker, Munich Summer Institute, Munich
31. May 2019, Keynote Speaker, 3rd Doctoral Workshop on the Economics of Digitization, Brussels
32. November 2019, FTC Hearings on Big Data, Privacy, and Competition
33. October 2019, FTC Hearings on Platform Economics, George Mason University
34. June 2018, Antitrust and Big Data, Penn Wharton China Center Conference, Beijing
35. June 2018, Marketing Science
36. May 2018, Boston College Digital Innovation Workshop
37. December 2017, Mobile Marketing and Big Data Conference, NYU
38. September 2017, NBER Economics of AI Conference
39. July 2017, BU Platforms Conference
40. July 2017, NBER Digitization Meetings
41. June 2017, Marketing Science
42. June 2017, Regulation of Algorithms, Berlin
43. May 2017, Boston College Digital Innovation Workshop
44. November 2016, ICANN Public Meetings
45. October 2016, Conference on Digital Experimentation, Cambridge, MA
46. September 2016, FTC Consumer Protection Conference, Washington, DC
47. September 2016, George Washington roundtable on Platforms, Washington DC
48. May 2016, Competing with Big Data, Brugel, Brussels, Belgium
49. April 2016, NBER Innovation and Policy, Washington DC
50. April 2016, Financial Services Roundtable, NYC
51. March 2016, Digitization Tutorial, NBER
52. January 2016, PrivacyCon, FTC Conference, Washington, DC

53. July 2015, NBER Law and Economics (co-author presented), Cambridge, MA
54. July 2015, NBER Economics of Digitization, Cambridge, MA
55. June 2015, 'The Future of Research in the Digital Society', French Ministry of Culture and Communication - Toulouse School of Economics, Paris, France
56. June 2015, Marketing Science, Baltimore, MD
57. June 2015, Doctoral Consortium, Baltimore, MD
58. March 2015, IP Leadership Conference, Washington, DC
59. February 2015, Patents in Theory and Practice, Washington, DC
60. June 2014, Marketing Science, Atlanta, GA
61. May 2014, Boston College Social Media Workshop, Boston, MA
62. January 2014, American Economic Association Meetings
63. July 2013, Marketing Science, Istanbul, Turkey
64. June 2013, Searle Center Conference on Internet Search and Innovation, Chicago, IL
65. April 2013, Brown University Mini-Networks Conference
66. February 2013, WSDM 2013 Conference (Keynote Speaker), Rome, Italy
67. January 2013, American Economic Association Meetings, San Diego, CA (Co-author presented)
68. December 2012, New York Computer Science and Economics Day
69. November 2012, Search and Competition Conference, Melbourne Australia
70. October 2012, Economics of Personal Data, (Keynote Speaker), Amsterdam
71. August 2012, Amsterdam Symposium on Behavioral and Experimental Economics
72. July 2012, Fudan University Marketing Research Symposium, China
73. June 2012, Searle Center Conference on Internet Search and Innovation, Chicago, IL
74. June 2012, Innovation, Intellectual Property and Competition Policy Conference, Tilburg, Netherlands
75. June 2012, Marketing Science, Boston, MA
76. June 2012, Social Media and Business Transformation, Baltimore, MD
77. May 2012, The Law and Economics of Search Engines and Online Advertising, George Mason University, Arlington, VA
78. February 2012, NBER Economics of Digitization (co-author presented), Cambridge, MA
79. January 2012, Symposium on Antitrust and High-Tech Industries, George Mason University, VA
80. January 2012, Patents, Standards and Innovation, Tucson, AZ
81. January 2012, Econometric Society Meetings, Chicago, IL
82. January 2012, AEA Meetings (2 papers), Chicago, IL
83. December 2011, Economics of Privacy Workshop, Boulder, CO
84. November 2011, Economics and Computation Day, Cambridge, MA
85. November 2011, HBS Strategy Research Conference, Boston, MA
86. November 2011, The Law and Economics of Internet Search and Online Advertising Roundtable, George Mason University, Arlington, VA
87. November 2011, Patents Statistics for Decision Makers, Alexandria, VA
88. October 2011, Workshop on Health IT and Economics, Washington, DC
89. October 2011, Innovation, Organizations and Society, University of Chicago, IL
90. October 2011, Direct Marketing Research Summit, Boston, MA
91. September 2011, Invited Session 'Economics and Marketing', EARIE, Stockholm, Sweden.

92. July 2011, NBER Economics of Digitization, Cambridge, MA
93. July 2011, SICS, Berkeley, CA
94. June 2011, The Law and Economics of Search Engines and Online Advertising, George Mason University, Arlington, VA
95. June 2011, Workshop on the Economics on Information Security, Washington, DC
96. June 2011, Marketing Science (3 papers), Houston, TX
97. June 2011, Searle Center Conference on Internet Search and Innovation, Chicago, IL
98. May 2011, Boston College Social Media Workshop, Boston, MA
99. May 2011, Technology Pricing Forum, Boston, MA
100. April 2011, NBER Innovation Policy and the Economy, Washington, DC
101. April 2011, International Industrial Organization Conference (3 papers), Boston, MA
102. March 2011, Technology Policy Institute, Washington, DC
103. February 2011, NBER Economics of Digitization (co-author presented), Palo Alto, CA
104. January 2011, Sixth bi-annual Conference on The Economics of Intellectual Property, Software and the Internet (2 papers, plenary speaker), Toulouse, France
105. January 2011, MSI Young Scholars Conference, Park City, UT
106. December 2010, Workshop on Information Systems and Economics, Washington University of St. Louis (co-author presented), St. Louis, MO
107. December 2010, OECD Economics of Privacy Roundtable, Paris, France
108. November 2010, Net Institute Conference, New York, NY
109. October 2010, Workshop on Media Economics and Public Policy (co-author presented), New York, NY
110. October 2010, Workshop on Health IT and Economics, Washington, DC
111. September 2010, ITIF and CAGW Privacy Working Group Meetings, Washington, DC
112. September 2010, Medical Malpractice Conference, Mohegan, CT
113. September 2010, Search and Web Advertising Strategies and Their Impacts on Consumer Workshop, Paris, France
114. July 2010, NBER Meetings (IT), Cambridge, MA
115. July 2010, NBER Meetings (Healthcare and IT), Cambridge, MA
116. July 2010, SICS, Berkeley, CA
117. July 2010, Keynote Speaker, 8th ZEW Conference on the Economics of Information and Communication Technologies, Mannheim, Germany
118. June 2010, American Society of Health Economists Conference, Cornell, NY
119. June 2010, Marketing Science (2 papers), Koeln, Germany
120. June 2010, Workshop on the Economics of Information Security (2 papers), Harvard, MA
121. January 2010, AEA Meetings, Atlanta, GA
122. December 2009, Workshop on Information Systems and Economics, Scottsdale, AZ
123. November 2009, WPP/Google Marketing Awards, Cambridge, MA
124. July 2009, NBER meetings (IT), Cambridge, MA
125. June 2009, IHIF Debate on Privacy, Washington, DC
126. June 2009, Marketing Science, Ann Arbor, MI
127. April 2009, International Industrial Organization Conference, Boston, MA
128. January 2009, Information Security Best Practices Conference, Philadelphia, PA
129. January 2009, Modeling Social Network Data Conference, Philadelphia, PA
130. July 2008, NBER Meetings (Productivity), Cambridge, MA

131. July 2008, SICS, Berkeley, CA
132. July 2008, Fourth Workshop on Ad Auctions, Chicago, MA
133. June 2008, Marketing Science, Vancouver, BC
134. May 2008, International Industrial Organization Conference, Richmond, VA
135. April 2008, Net Institute Conference, New York, NY
136. November 2007, NBER Health Meetings (Co-author presented), Boston, MA
137. July 2007, SICS, Berkeley, CA
138. June 2007, Workshop on the Economics of Information Security, Pittsburgh
139. June 2007, Choice Symposium, Philadelphia, PA
140. May 2007, eCommerce Research Symposium, Stamford, CT
141. April 2007, Net Institute Conference, New York, NY
142. April 2007, International Industrial Organization Conference, Savannah, GA
143. March 2007, Health Economics Conference, Tucson, AZ
144. February 2007, NBER Winter Meetings, Palo Alto, CA
145. January 2007, Economics of the Software and Internet Industries (2 Papers), Toulouse, France
146. October 2006, QME Conference, Stanford University, CA
147. June 2006, Marketing Science, Pittsburgh, PA
148. April 2006, International Industrial Organization Conference, Boston, MA
149. October 2005, NEMC Conference, Boston, MA
150. October 2005, TPRC Conference, Washington, DC
151. June 2005, CRES Industrial Organization Conference, Washington University in St. Louis, MO
152. July 2002, Payment Systems Conference, IDEI, Toulouse, France

PROFESSIONAL SERVICE

- Senior Editor, Marketing Science
- Director of the program on the Economics of Digitization at The National Bureau of Economic Research.
- Co-Director of the program on the Artificial Intelligence at The National Bureau of Economic Research.
- **Vice President (Education)**, ISMS 2019-2021
- **Associate Editor**: Management Science, Marketing Science, Journal of Marketing Research, International Journal of Research in Marketing
- **Associate Editor**: Information Systems Research, Special Issue on Social Media and Business Transformation
- **Departmental Editor**: Quantitative Marketing and Economics
- **Editor**: The Economics of the Internet, Palgrave Dictionary of Economics
- **Co-Editor**: NBER: The Economics of Digitization - An Agenda
- **Co-Editor**: Information Economics and Policy, Special Issue on Economics of Digital Media Markets
- **Editorial Review Board**: Journal of Marketing, ISR Special Issue on Managing Digital Vulnerabilities, Journal of Economic Literature

- **Conference Program Committees**

- 2022 Co-organizer, NBER Conference on Digital Economics
- 2022 Co-organizer, NBER Conference on the Economics of Artificial Intelligence
- 2021 Co-organizer, NBER Conference on Digital Economics
- 2021 Co-organizer, NBER Conference on the Economics of Artificial Intelligence
- 2020 Co-organizer, NBER Conference on the Economics of Artificial Intelligence
- 2020 Organizer, ISMS Doctoral Consortium
- 2019 Co-organizer, NBER Conference on the Economics of Artificial Intelligence
- 2019 Scientific Committee: ZEW Conference on the Economics of Information and Communication Technologies
- 2019 Program Committee: Workshop on the Economics of Information Security
- 2019 Scientific Committee: IP Statistics for Decision Makers
- 2018 Co-organizer, NBER Conference on the Economics of Artificial Intelligence
- 2017 Scientific Committee: IP Statistics for Decision Makers
- 2017 Scientific Committee: ZEW Conference on the Economics of Information and Communication Technologies
- 2017 Program Committee: Workshop on the Economics of Information Security
- 2016 Program Committee: Workshop on the Economics of Information Security
- 2016 Scientific Committee: ZEW Conference on the Economics of Information and Communication Technologies
- 2015 Scientific Committee: Competition, Standardization and Innovation
- 2015 Scientific Committee: Intellectual Property Statistics for Decision Makers
- 2015 Associate Editor: ICIS 2015, Healthcare track
- 2015 Scientific Committee: European Association for Research in Industrial Economics
- 2015 Program Committee: ACM Conference on Economics and Computation
- 2015 Program Committee: Workshop on the Economics of Information Security
- 2015 Chief-Organizer: Quantitative Marketing and Economics Conference
- 2015 Scientific Committee: ZEW Conference on the Economics of Information and Communication Technologies
- 2014 Scientific Committee: European Association for Research in Industrial Economics
- 2014 Scientific Committee: Conference on the Economics of Information and Communication Technologies
- 2014 Program Committee: International Conference on Big Data and Analytics in Healthcare
- 2013 Program Committee: Quantitative Marketing and Economics
- 2013 Scientific Committee: European Association for Research in Industrial Economics Conference
- 2013 Scientific Committee: Conference on the Economics of Information and Communication Technologies
- 2013 Program Committee: Workshop on the Economics of Information Security
- 2013 Associate Editor of Personal Data Markets Track: ECIS 2013
- 2012 Program Committee: European Association for Research in Industrial Economics Conference
- 2012 Program Committee (Conference Organizer) NBER: The Economics of Digitization Pre-Conference, June 2012

- 2012 Scientific Committee: Conference on the Economics of Information and Communication Technologies
- 2012 Senior Program Committee: 13th ACM Conference on Electronic Commerce
- 2012 Program Committee: Workshop on the Economics of Information Security
- 2011 Scientific Committee: European Association for Research in Industrial Economics Conference
- 2011 Scientific Committee: Conference on the Economics of Information and Communication Technologies
- 2011 Program Committee: Ad Auctions Workshop
- 2011 Program Committee: Workshop on the Economics of Information Security
- 2010 Program Committee: Workshop on IT and Economic Growth
- 2010 Program Committee: Conference on Health IT and Economics
- 2010 Program Committee: Workshop on the Economics of Information Security
- 2009 Program Committee: Workshop on the Economics of Information Security
- 2008 Program Committee: Workshop on the Economics of Information Security
- 2008 Program Committee: Ad Auctions Workshop

External Affiliations

- **Affiliate:** CESifo Research Network
- **Advisory Board:** Future of Privacy Forum
- **Advisory Board:** Academic Advisory Counsel, Brookings Center on Regulation and Markets

MIT SERVICE

- 2015- Faculty Chair, PhD program
- 2015- EMBA Committee
- 2015- ASB Committee
- 2014- MIT Sloan Gender Equity Committee
- 2013-2014 Group Head, Marketing Group
- 2013-2014 Chair, Marketing Faculty Search Committee
- 2013-2014 MIT Committee on Undergraduate Admissions and Financial Aid
- 2011 North East Marketing Conference Coordinator
- 2011 MIT Sloan Marketing Conference, Panel Moderator
- 2011 Sloan Women in Management Conference, Panel Moderator
- 2005, 2008, 2012 Marketing Faculty Search Committee

ADVISING

- 2019: Shuyi Yu, PhD Thesis supervisor
- 2016: Abhishek Nagaraj, PhD Thesis advisor
- 2012: Cristina Nistor, PhD Thesis advisor
- 2010: Katherine Molina, Masters Thesis

- 2008: Dinesh Shenoy, Masters Thesis
- 2007: James Kelm, Masters Thesis

GRANTS AND SUPPORT

Academic Grants

2018	Sloan Foundation Grant (2018-2021), 'NBER Project on the Economics of Artificial Intelligence' - Grant supporting series of NBER Economics of AI Conferences. (Joint with Ajay Agrawal, Joshua Gans and Avi Goldfarb)	\$914,250
2017	Net Institute Grant (Joint with Anuj Kapoor)	\$3,000
2016	Net Institute Grant (Joint with Christian Catalini)	\$6,000
2013	MSI research Grant 4-1840 (Joint with Anja Lembrecht)	\$10,200
2011	Tilburg Law and Economics Center (TILEC) IIPC grant	\$21,000
2011	Google Grant	\$50,000
2011	Junior Faculty Research Assistance Program	\$30,000
2011	Net Institute Grant	\$6,000
2011	NBER Digitization Grant	\$20,000
2011	NSF CAREER Award	\$502,000
2010	Time-Warner Research Program on Digital Communications	\$20,000
2010	Net Institute Grant	\$6,000
2009	Net Institute Grant	\$6,000
2009	The James H. Ferry, Jr. Fund for Innovation in Research Education	\$50,000
2009	Google/WPP Grant (Joint with Avi Goldfarb)	\$55,000
2008	Net Institute Grant	\$15,000
2007	Net Institute Grant	\$8,000
2006	Net Institute Grant (Joint with Stephen Ryan)	\$8,000

Industry Research Grants

2015	CCIA Research: Research into Sustainable Competitive Advantage and Big Data (Joint with Anja Lembrecht)	\$60,000
2015	E-Logic: Research into Vertical Mergers and Patent Litigation	\$60,000
2014	CCIA Research: Research into Patent Litigation and Entrepreneurship	\$100,000
2012	Google Australia: Research into Measurement and Attribution	\$50,000

EXPERT TESTIMONY

- I have provided expert testimony for Accenture, Atlantic Recording Company, ADT, Bausch Health, Broadcast Music Inc, Capitol Records, Context Logic, Facebook, Google,

IAC, Lyft, Marriott, Match Group, Microsoft, Plaintiffs in Blue Cross Blue Shield Antitrust Litigation, Revizer, Reynolds Automotive, RDIC, Samsung, Sony, Sound Exchange, Verizon (Yahoo and AOL), United Health Group, US Debtors (Nortel Bankruptcy Proceedings), Walworth Investments and Warner Brothers.

TEACHING

- 15.818, Pricing (MBA Elective) 2006-
- 15.732, Marketing Management for Senior Executives 2012-
- 15.726, Pricing (EMBA Elective) 2012-
- 15.838, Doctoral Seminar, Spring 2006, Fall 2007, Fall 2013
- Marketing Management, Asian School of Business, 2016
- Guest Lecturer: HST.936: Health information systems to improve quality of care in resource-poor settings, 2014
- Executive Education: Blockchain Technologies: Business Innovation and Application, 2018-
- Executive Education: Marketing Innovation, 2016-
- Executive Education: Pricing 4dX, 2016-
- Executive Education: Strategic Marketing for the Technical Executive, 2012-2015
- Executive Education: Systematic Innovation of Products, Processes, and Services, 2013-
- Executive Education: Platform Strategy: Building and Thriving in a Vibrant Ecosystem, 2014-
- Executive Education: Global Executive Academy (multi-language), 2013, 2014
- Executive Education: Entrepreneurship Development Program, 2012-
- Faculty Coach, Takeda Leadership Academy, 2016-18

APPENDIX B – PRIOR TESTIMONY

1. In Re: Lyft Rideshare Cases, Case No. CJC-20-005061, Superior Court of the State of California County of San Francisco. Deposition (2023)
2. In Re: Google Play Store Antitrust Litigation, MDL No.: 3:21-md-2981, United States District Court for the Northern District of California. Deposition (2023)
3. United States of America et al. v. United Health Group Incorporated et al., Case No. 1:22-cv-00481, In the United States District Court for the District of Columbia Court. Deposition and Trial (2022).
4. United States of America, et al., v. Google LLC, Case No.: 1:20-cv-03010-APM, and State of Colorado, et al., v. Google LLC, Case No.: 1:20-cv-03715-APM, In the United States District Court for the District of Columbia. Deposition (2022).
5. Atlantic Recording Corporation, Laface Records LLC, Sony Music Entertainment, UMG Recordings, Inc., Warner Bros. Records Inc., Arista Music, Arista Records LLC, Bad Boy Records LLC, Capitol Records, LLC, Elektra Entertainment Group Inc., Roc-A-Fella Records, LLC, Sony Music Entertainment US Latin LLC, Zomba Recording LLC, v. Spinrilla, LLC and Jeffery Dylan Copeland, Civil Action No. 1:17-cv-00431, United States District Court for the Northern District of Georgia Atlanta Division. Deposition (2022).
6. Broadcast Music, Inc. v. North American Concert Promoters Association., 18 Civ. 8749, Related to United States v. Broadcast Music, Inc., 64 Civ. 3787, United States District Court Southern District of New York. Deposition and Trial (2022).
7. In Re: Marriott International Customer Data Breach Litigation, MDL No.: 19-md-2879, United States District Court for the District of Maryland. Deposition (2021) and Hearing (2022).
8. Cox Automotive, Inc.; Autotrader.com, Inc.; Dealer Dot Com, Inc.; Dealertrack, Inc.; Homenet, Inc.; Kelley Blue Book Co., Inc.; Vauto, Inc.; Vinsolutions, Inc.; and Xtime, Inc., v. The Reynolds and Reynolds Company, AAA Case No. 01-19-0000-4548, American Arbitration Association. Deposition (2021).
9. dotStrategy, Co., Individually and On Behalf of All Other Similarly Situated, v. Facebook, Inc., Case No. 20-cv-00170-WHA, United States District Court for the Northern District of California. Deposition (2021).
10. Deborah Louise Douez, v. Facebook, Inc., Case No. VLC-S-S-122316, Supreme Court of British Columbia, Vancouver Registry. Cross Examination (2021).
11. Sean Rad, Plaintiff/Counterclaim-Defendant, Paul Cafardo, Gareth Johnson, Alexa Mateen, Justin Mateen, and Ryan Ogle, Plaintiffs, v. IAC/InteractiveCorp, Match Group, Inc., and Match Group, LLC, Defendants/Counterclaim-Plaintiffs. Index No. 654038/2018, Supreme

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Court of the State of New York, County of New York. Deposition and Trial (2021).

12. TravelPass Group, LLC, Partner Fusion, Inc., Reservation Counter, LLC, v. Caesars Entertainment Corporation, Choice Hotels International, Inc., Hilton Domestic Operating Company Inc., Hyatt Hotels Corporation, Marriott International, Inc., Red Roof Inns, Inc., Six Continents Hotels, Inc., Wyndham Hotel Group, LLC., Case No. 5:18-cv-152-RWS-CMC, United States District Court, Eastern District of Texas, Texarkana Division. Deposition and Trial (2021).
13. DZ Reserve, and Cain Maxwell (d/b/a Max Martialis) individually and on behalf of others similarly situated v. Facebook, Inc., Case No. 3:18-cv-04978, United States District Court, Northern District of California. Deposition (2021).
14. Integritymessageboard.com. LLC, v. Facebook, Inc., Case No. 4:18-cv-05286-PJH, United States District Court, Northern District of California. Deposition (2021).
15. In re: Blue Cross Blue Shield Antitrust Litigation (MDL No. 2406), Master File No. 2:13-CV-20000-RDP, United States District Court, Northern District of Alabama, Southern Division. Deposition (2021).
16. In Re: Glumetza Antitrust Litigation, Case No. 3:19-cv-05822-WHA, United States District Court for the Northern District of California. Deposition (2020).
17. In re Determination of Rates and Terms for Digital Performance of Sound Recordings and Making of Ephemeral Copies to Facilitate those Performances (Web V), Case No. 19-CRB-0005-WR (2021-2025), United States Copyright Royalty Judges, Washington, D.C. Deposition and Hearing (2020).
18. Stephen Adkins, et al., v. Facebook, Inc., Case No. 18-CV-05982-WHA, United States District Court, Northern District of California. Deposition (2019).
19. DealDash OYJ and DealDash Inc, Plaintiffs vs, Contextlogic Inc. d/b/a Wish, Defendant, Case No. 18-cv-02353-MMC, District Court of Northern California. Deposition (2019).
20. In Re Disposable Contact Lens Antitrust Litigation. No. 3:15-md-2626-J-20JRK United States District Court, Middle District of Florida, Jacksonville Division. Deposition (2018, 2020).

APPENDIX C – MATERIALS CONSIDERED

Legal Documents

Expert Report of DeJongh “Dee” Wells, *Nike Inc. v. StockX LLC*, 1:22-cv-000983-VEC, May 5, 2023.

First Amended Complaint, *Nike, Inc. v. StockX LLC*, No. 1:22-cv-000983-VEC, May 25, 2022.

Bates-Stamped Documents

StockX, “Customer Research: Innovation Survey Report,” July 13, 2021, STX0026540-578.

StockX, “Email From Shervin Moghaddam to Scott Cutler and Yasir Malik,” January 20, 2022, STX0039795-801.

StockX, “Email From Yasir Malik to Greg Schwartz and Jacob Fenton,” January 19, 2022, STX0102190-195.

StockX, “Physical Data,” STX0806026.

StockX, “StockX Trading,” May 27, 2021, STX0039521-584.

StockX, “Vault Drop 1 Pricing,” January 11, 2022, STX0121216.

StockX, “Vault NFT Data,” STX0806025.

Academic Papers

Abreu, Dilip, and Markus Brunnermeier, “Bubbles and Crashes,” *Econometrica*, Vol. 71, No. 1, 2003, pp. 173-204.

Akerlof, George, “The Market for ‘Lemons’: Quality Uncertainty and the Market Mechanism,” *The Quarterly Journal of Economics*, Vol. 84, No. 3, 1970, pp. 488-500.

Almeida, José, and Tiago Cruz Gonçalves, “A Systematic Literature Review of Investor Behavior in the Cryptocurrency Markets,” *Journal of Behavioral and Experimental Finance*, Vol. 37, 2023, pp. 1-18.

Athey, Susan, Christian Catalini, and Catherine Tucker, “The Digital Privacy Paradox: Small Money, Small Costs, Small Talk,” *NBER Working Paper 23488*, 2017, pp. 1-26.

Bakos, Yannis, and Hanna Halaburda, “The Role of Cryptographic Tokens and ICOs in Fostering Platform Adoption,” *Social Science Research Network*, 2019, pp. 1-40.

Bleier, Alexander, Avi Goldfarb, and Catherine Tucker, “Consumer Privacy and the Future of Data-Based Innovation and Marketing,” *International Journal of Research in Marketing*, Vol. 37, No. 3, 2020, pp. 466-480.

boyd, danah, and Nicole Ellison, “Social Network Sites: Definition, History, and Scholarship,” *Journal of Computer-Mediated Communication*, Vol. 13, No. 1, 2008, pp. 210-230.

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Catalini, Christian, and Joshua Gans, “Initial Coin Offerings and Value of Crypto Tokens,” *Social Science Research Network*, 2019, pp. 1-37.

Catalini, Christian, and Catherine Tucker, “Antitrust and Costless Verification: an Optimist and a Pessimistic View of the Implications of Blockchain Technology,” *Antitrust Law Journal*, Vol. 82, No. 3, 2019, pp. 861-872.

Catalini, Christian, and Catherine Tucker, “Seeding the S-Curve? The Role of Early Adopters in Diffusion,” *NBER Working Paper 22596*, 2016, pp. 1-32.

Catalini, Christian, and Catherine Tucker, “When Early Adopters Don’t Adopt,” *Science*, Vol. 357, No. 6347, 2017, pp. 135-136.

Cong, Lin William, Xiang Hui, Catherine Tucker, and Luofeng Zhou, “Scaling Smart Contracts Via Layer-2 Technologies: Some Empirical Evidence,” *NBER Working Paper 30912*, 2023, pp. 1-20.

Conley, John, “Blockchain and the Economics of Crypto-tokens and Initial Coin Offerings,” *Vanderbilt University Department of Economics Working Papers*, 2017, pp. 1-18.

Cui, Tony Haitao, Anindya Ghose, Hanna Halaburda, Raghuram Iyengar, Koen Pauwels, S. Sriram, Catherine Tucker, and Sriraman Venkataraman, “Informational Challenges in Omnichannel Marketing: Remedies and Future Research,” *Journal of Marketing*, Vol. 85, No. 1, 2021, pp. 103-120.

Evans, David, “The Antitrust Economics of Multi-Sided Platform Markets,” *Yale Journal on Regulation*, Vol. 20, 2003, pp. 325-381.

Evans, David, and Michael Noel, “Defining Markets that Involve Multi-sided Platform Businesses: An Empirical Framework with an Application to Google’s Purchase of DoubleClick,” *Working Paper*, No. 07-18, 2007, pp. 1-47.

Fradkin, Andrey, Elena Grewal, David Holtz, and Matthew Pearson, “Bias and Reciprocity in Online Reviews: Evidence From Field Experiments on Airbnb” presented at EC ’15: Proceedings of the Sixteenth ACM Conference on Economics and Computation (Cambridge, MA, July 15, 2015).

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Lei, Vivian, Charles Noussair, and Charles Plott, “Nonspeculative Bubbles in Experimental Asset Markets: Lack of Common Knowledge of Rationality vs. Actual Irrationality,” *Econometrica*, Vol. 69, No. 4, 2001, pp. 831-859.

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Maouchi, Youcef, Lanouar Charfeddine, and Ghassen El Montasser, “Understanding Digital Bubbles Amidst the COVID-19 Pandemic: Evidence from DeFi and NFTs,” *Finance Research Letters*, Vol. 47, 2022, pp. 1-8.

Marthews, Alex, and Catherine Tucker, “What Blockchain Can and Can’t Do: Applications to Marketing and Privacy,” *International Journal of Research in Marketing*, Vol. 40, No. 1, 2023, pp. 49-53.

Nosko, Chris, and Steven Tadelis, “The Limits of Reputation in Platform Markets: An Empirical Analysis and Field Experiment,” *NBER Working Paper 20830*, 2015, pp. 1-36.

Plangger, Kirk, Dhruv Grewal, Ko De Ruyter, and Catherine Tucker, “The Future of Digital Technologies in Marketing: A conceptual Framework and an Overview,” *Journal of the Academy of Marketing Science*, Vol. 50, No. 6, 2022, pp. 1125-1134.

Sharma, Akshita, Jatin Gupta, Lovika Gera, Mehul Sati, and Shikha Sharma, “Relationship between customer satisfaction and loyalty,” *Social Science Research Network*, 2020.

Sorescu, Alina, Sorin M. Sorescu, Will J. Armstrong, and Bart Devoldere, “Two Centuries of Innovations and Stock Market Bubbles,” *Marketing Science*, Vol. 37, No. 4, 2018, pp. 507-529.

Tadelis, Steven, “Reputation and Feedback Systems in Online Platform Markets,” *NBER Working Paper*, 2016, pp. 1-33.

Temin, Peter, and Hans-Joachim Voth, “Riding the South Sea Bubble,” *American Economic Review*, Vol. 94, No. 5, 2004, pp. 1654-1668.

Tucker, Catherine, “Digital Infrastructure: Does the ‘Coring’ of Digital Platforms Make Them Part of Digital Infrastructure?,” *Working Paper*, 2020, pp. 1-7.

Tucker, Catherine, “How Platforms Create Value Through Coring and Implications for Market Definition,” *CPI Antitrust Chronicle*, Vol. 2, No. 2, 2022, pp. 16-19.

Tucker, Catherine, “Identifying Formal and Informal Influence in Technology Adoption with Network Externalities,” *Management Science*, Vol. 54, No. 12, 2008, pp. 2024-2038.

Books

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Belleflamme, Paul, and Martin Peitz, *The Economics of Platforms*, Cambridge, UK, Cambridge University Press, 2021.

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Shiller, Robert, *Irrational Exuberance* 3rd Ed., Princeton, NJ, Princeton University Press, 2016.

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Public Documents

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APPENDIX D – ADDITIONAL DATA ANALYSES

Exhibit D1: Summary Statistics of Vault NFT Releases²¹²

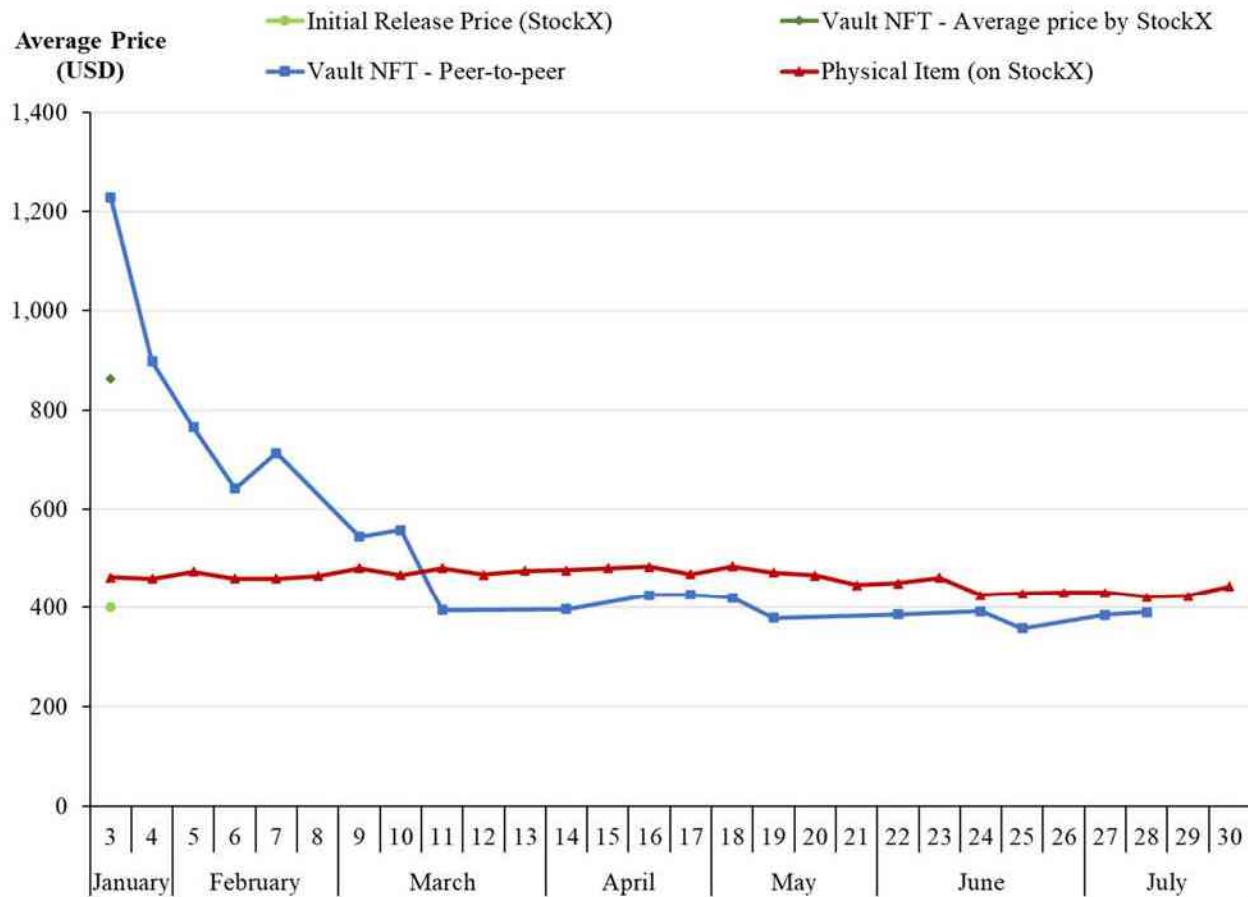
Model of Corresponding Nike Shoe	Initial Release Price	Manufacturer's Suggested Retail Price	Average Price on Release Date		Total Number of Released Vault NFTs	
			StockX	P2P	Initial Release Price	Market Price
Air Jordan 1 Retro High OG Bred Patent	\$300	\$170	–	\$756	191	17
Air Jordan 4 Retro White Oreo 2021	\$400	\$190	\$1,316	\$1,497	49	51
Nike Dunk Low Retro White Black 2021	\$220	\$110	\$1,319	\$1,631	52	48
Nike Blazer Low sacai KAWS Blue	\$120	\$140	\$1,002	\$1,182	54	46
Nike SB Dunk Low Ben Jerrys Chunky Dunky	\$1,250	\$100	–	–	2	1
Nike Air VaporMax 2019 CPFM	\$600	\$250	\$2,050	–	2	1
Air Jordan 3 Retro A Ma Maniere W	\$450	\$200	–	\$2,900	1	0
Nike Dunk Low Off White Lot 50	\$750	\$180	\$5,000	–	0	1

Note: Each Vault NFT model was first released on January 18, 2022, except for the Air Jordan 1, which was first released on January 26, 2022. The initial release price for Vault NFTs linked to the Air Jordan 1 sneakers is inferred based on their uniform price of \$300 sold by StockX on the day of release.

_____ he number of releases is recorded in the first two columns. The average price on the release date for StockX covers any releases that were not released at the initial release price, but at market prices.

²¹² StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026. See also StockX, “Vault Drop 1 Pricing,” January 11, 2022, STX0121216 (providing release prices).

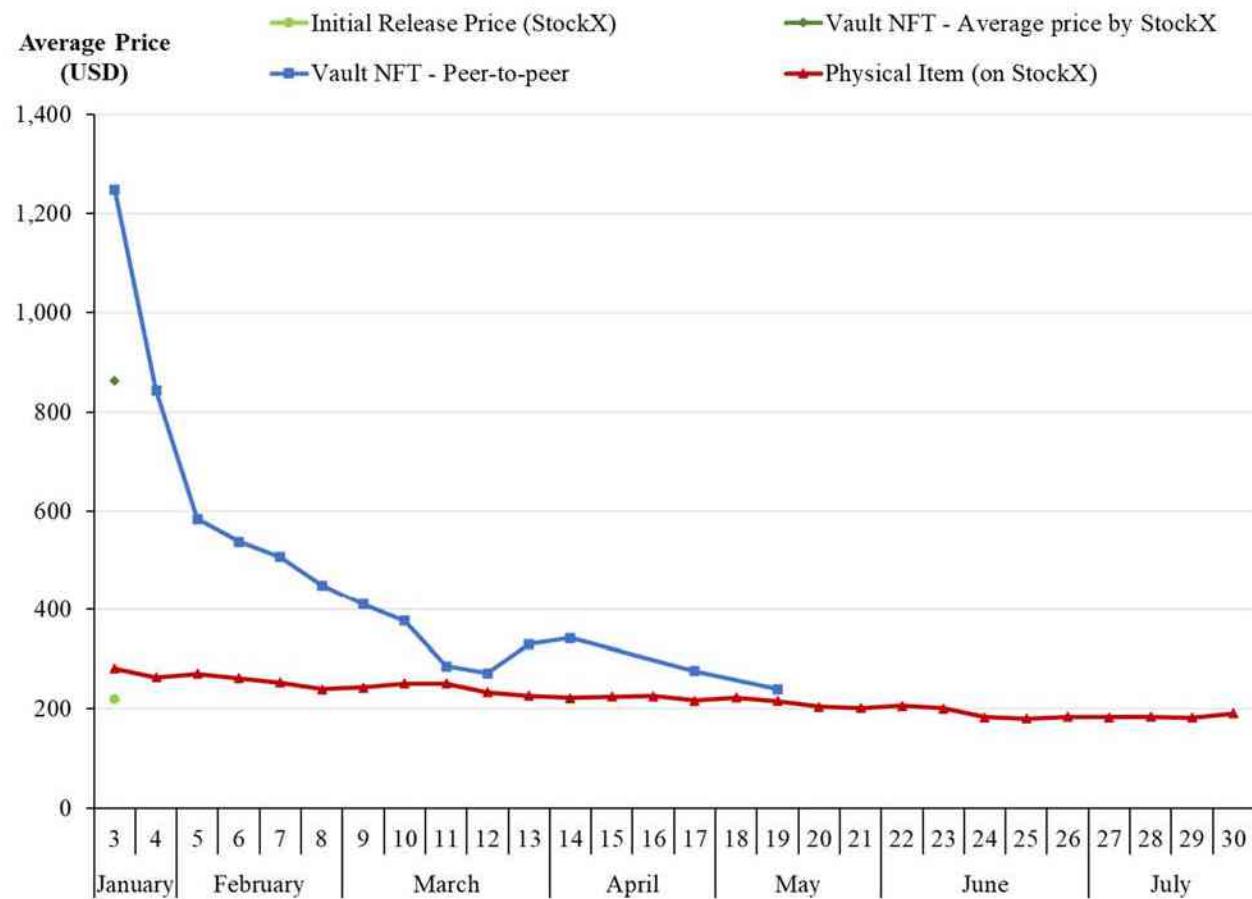
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Exhibit D2: Weekly Average Prices of Air Jordan 4 Retro White Oreo 2021 Sneakers²¹³**Notes:**

[1] All Vault NFTs for this model were released by StockX on January 18, 2022.

[2] This chart shows the weekly average price of physical sneaker and Vault NFT transactions, using the variable for Gross Monetary Value. “Vault NFT – Average price by StockX” reflects the average release price of the Vault NFTs that were not sold at the initial release price. “Physical Item (on StockX)” refers to the average price of the associated physical sneaker on StockX. StockX’s initial release price and the average release price differ. [REDACTED]

²¹³ StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026. See also StockX, “Vault Drop 1 Pricing,” January 11, 2022, STX0121216 (providing release prices).

Exhibit D3: Weekly Average Prices of Nike Dunk Low Retro White Black 2021 Sneakers²¹⁴**Notes:**

[1] All Vault NFTs for this model were released by StockX on January 18, 2022.

[2] This chart shows the weekly average price of physical sneaker and Vault NFT transactions, using the variable for Gross Monetary Value. “Vault NFT – Average price by StockX” reflects the average release price of the Vault NFTs that were not sold at the initial release price. “Physical Item (on StockX)” refers to the average price of the associated physical sneaker on StockX. StockX’s initial release price and the average release price differ. [REDACTED]

²¹⁴ StockX, “Vault NFT Data,” STX0806025; StockX, “Physical Data,” STX0806026. See also StockX, “Vault Drop 1 Pricing,” January 11, 2022, STX0121216 (providing release prices).